CLAIMS

1. A direct access storage device for buffering at least a portion of a multimedia program segmented into a custom ordered series of source program segments, each of the source program segments being representative of a unique portion of the multimedia program, the direct access storage device comprising:

at least one data storage disk having a plurality of data storing regions disposed on any of a lower disk surface and an upper disk surface;

a spindle motor for rotating the at least one data storage disk;

an actuator having elongated arms;

a transducer disposed on each of the elongated arms; and

a controller for coordinating writing of the source program segments to the plurality of data storing regions, and for coordinating reading of the source program segments from the data storing regions as sequentially ordered local program segments.

2. A system as claimed in Claim 1, wherein:

the at least one data storage disk includes an upper data storing region disposed on the upper disk surface and a lower data storing region disposed on the lower disk surface; and

the controller coordinates writing of the source program segments to the upper and lower data storing regions, and coordinates reading of the source program segments from the upper and lower data storing regions as sequentially ordered local program segments.

3. A system as claimed in Claim 1, wherein:

the at least one data storage disk includes an upper data storing region disposed on the upper disk surface and a lower data storing region disposed on the lower disk surface; and

the controller coordinates writing of a predetermined number of the source program segments to the upper and lower data storing regions, and coordinates reading of the predetermined number of source program segments from the upper and lower data storing regions as sequentially ordered local program segments.

4. A system as claimed in Claim 3, wherein the predetermined number of the source program segments is a number less than a number of the source program segments defining the entirety of the multimedia program.

5. A system as claimed in Claim 3, wherein each of the predetermined number of the source program segments is overwritten by a subsequently written source program segment on a first-written-first-read basis.

6. A system as claimed in Claim 1, wherein the controller, in response to either one of a forward and a reverse presentation control signal, respectively coordinates forward sequential and reversed sequential reading of the source program segments from the plurality of data storing regions.

7. A system as claimed in Claim 1, wherein the source program segments are arranged in a plurality of packets, and the controller coordinates writing of the source program segments arranged in consecutive packets of

the plurality of packets alternately to the plurality of data storing regions.

8. A system as claimed in Claim 1, wherein the at least one data storage disk comprises:

a first spiral data track disposed on either one of the lower and upper disk surfaces; and

a second spiral data track disposed on the other one of the lower and upper disk surfaces.

9. A system as claimed in Claim 1, wherein the at least one data storage disk comprises:

a data band;

an inner spiral diameter location and an outer spiral diameter location defined within the data band;

a first spiral data track disposed on either one of the lower and upper disk surfaces;

a second spiral data track disposed on the other one of the lower and upper disk surfaces; and

the controller coordinates the progressive movement of the actuator substantially along the first spiral data track until either one of the inner and outer spiral diameter locations is reached, and coordinates the progressive movement of the actuator substantially along the second spiral data track until the other one of the inner and outer spiral diameter locations is reached.

10. A system as claimed in Claim 9, wherein the controller coordinates writing of at least one source program segment from a first transducer to the first spiral data track during a single progression of the actuator between the inner and outer spiral diameter locations, and coordinates reading of at least one previously written source program segment from the first spiral data track by

the first transducer during the single progression of the actuator between the inner and outer spiral diameter locations.

11. A system as claimed in Claim 1, wherein the source program segments written to and read from the data storing regions are compressed program segments.

12. A system as claimed in Claim 1, wherein a predetermined number of the source program segments are written to the plurality of data storing regions and define a presentation control window buffer, the source program segments being formatted in the presentation control window buffer in accordance with the equations:

$$SC = D \times M \times L \times S0; \text{ and}$$
$$PTD = D \times M \times L \times T0;$$

where:

SC is defined as a nominal storage capacity used for supporting the presentation control window buffer in megabytes;

D is defined as a number of data storage disk surfaces used for supporting the presentation control window buffer;

M is defined as a number of segment blocks per data storage disk surface used for supporting the presentation control window buffer;

L is defined as a length of each segment block as measured by the number of source program segments;

S0 is defined as an average size of each of the source program segments in megabytes;

PTD is defined as a duration of the presentation control window buffer in seconds; and

T0 is defined as a decompressed full-motion program time in seconds corresponding to each of the source program segments.

13. A system as claimed in Claim 1, wherein:

the custom ordered series of source program segments includes sequentially and non-sequentially ordered program segments; and

the controller coordinates writing of the non-sequentially ordered source program segments to the plurality of data storing regions, and coordinates reading of the non-sequentially ordered source program segments from the data storing regions as sequentially ordered local program segments.

14. A direct access storage device for buffering at least a portion of a multimedia program segmented into a custom ordered series of source program segments, each of the source program segments being representative of a unique portion of the multimedia program, the direct access storage device comprising:

at least one data storage disk having a plurality of data storing regions disposed on any of a lower disk surface and an upper disk surface;

a spindle motor for rotating the at least one data storage disk;

an actuator having elongated upper and lower actuator arms;

an upper transducer disposed on the upper actuator arm and a lower transducer disposed on the lower actuator arm; and

controller means for controlling the transfer of the source program segments from the upper and lower transducers to the plurality of data storing regions, and

for controlling the transfer of the source program segments as sequentially ordered local program segments from the data storing regions to the upper and lower transducers.

15. A system as claimed in Claim 14, wherein:

the at least one data storage disk includes an upper data storing region disposed on the upper disk surface and a lower data storing region disposed on the lower disk surface; and

the controller means includes means for controlling the transfer of the source program segments from the upper and lower transducers respectively to the upper and lower data storing regions, and for controlling the transfer of the source program segments as the sequentially ordered local program segments respectively from the upper and lower data storing regions to the upper and lower transducers.

16. A system as claimed in Claim 14, wherein:

the at least one data storage disk includes an upper data storing region disposed on the upper disk surface and a lower data storing region disposed on the lower disk surface; and

the controller means includes means for controlling the transfer of a predetermined number of the source program segments from the upper and lower transducers respectively to the upper and lower data storing regions, and for controlling the transfer of the predetermined number of the source program segments as the sequentially ordered local program segments respectively from the upper and lower data storing regions to the upper and lower transducers.

17. A system as claimed in Claim 16, wherein each of the predetermined number of source program segments is overwritten by a subsequently transferred source program segment on a first-written-first-read basis.

18. A system as claimed in Claim 14, wherein the controller means includes means, responsive to either one of a forward and a reverse presentation control signal, for respectively controlling forward sequential and reversed sequential transferring of the source program segments respectively from the upper and lower data storing regions to the upper and lower transducers.

19. A system as claimed in Claim 14, wherein the source program segments are arranged in a plurality of packets, and the controller means includes means for controlling the transfer of the source program segments arranged in consecutive packets of the plurality of packets alternately from the upper and lower transducers to the upper and lower data storing regions, respectively.

20. A system as claimed in Claim 14, wherein the at least one data storage disk comprises:

a first spiral data track disposed on either one of the lower and upper disk surfaces; and

a second spiral data track disposed on the other one of the lower and upper disk surfaces.

21. A system as claimed in Claim 14, wherein the at least one data storage disk comprises:

a data band;

an inner spiral diameter location and an outer spiral diameter location defined within the data band;

a lower spiral data track disposed on the lower disk surface;

an upper spiral data track disposed on the upper disk surface; and

the controller means includes means for controlling the progressive movement of the upper transducer substantially along the upper spiral data track until either one of the inner and outer spiral diameter locations is reached, and for controlling the progressive movement of the lower transducer substantially along the lower spiral data track until the other one of the inner and outer spiral diameter locations is reached.

22. A system as claimed in Claim 21, wherein the controller means includes means for controlling the transfer of at least one source program segment from either one of the lower and upper transducers respectively to either one of the lower and upper spiral data tracks during a single progression between the inner and outer spiral diameter locations, and for controlling the transfer of at least one previously transferred source program segment from either one of the lower and upper spiral data tracks respectively to either one of the lower and upper transducers during the single progression between the inner and outer spiral diameter locations.

23. A system as claimed in Claim 14, wherein:

the custom ordered series of source program segments includes non-sequentially and sequentially ordered program segments; and

the controller means for controlling the transfer of the non-sequentially ordered source program segments from the upper and lower transducers to the plurality of data storing regions, and for controlling the transfer of

the non-sequentially ordered source program segments as sequentially ordered local program segments from the data storing regions to the upper and lower transducers.

24. A method for transferring source program segments representative of a multimedia program to and from a direct access storage device, wherein each of the source program segments represents a unique portion of the multimedia program, the method comprising:

providing a direct access storage device having a plurality of data storing regions defined on a surface of at least one data storage disk disposed in the direct access storage device;

writing the source program segments to at least two of the plurality of data storing regions; and

reading the source program segments from the at least two of the plurality of data storing regions as sequentially ordered local program segments.

25. A method as claimed in Claim 24, wherein:

the source program segments include sequentially and non-sequentially ordered program segments;

the writing step includes the further step of writing the non-sequentially ordered program segments to the at least two of the plurality of data storing regions; and

the reading step includes the further step of reading the non-sequentially ordered program segments from the at least two of the plurality of data storing regions as the sequentially ordered local program segments.

26. A method as claimed in Claim 24, wherein the at least two of the plurality of data storing regions are defined along spiral data tracks provided on the surface of the at least one data storage disk.

27. A method as claimed in Claim 24, wherein:

the source program segments are arranged in packets; and

the writing step includes the further step of writing the source program segments of consecutive packets alternately to the at least two of the plurality of data storing regions.

28. A method as claimed in Claim 24, wherein:

the at least one data storage disk comprises:

a data band;

an inner diameter location and an outer diameter location defined within the data band;

a lower disk surface including a lower data storing region; and

an upper disk surface including an upper data storing region; and

the writing and reading steps include the further steps of:

writing at least one of the source program segments and reading at least one previously written source program segment respectively to and from the lower data storing region; and

writing at least another one of the source program segments and reading at least another previously written source program segment respectively to and from the upper data storing region.